

at all. One may either argue that the mature heath as seen today is an artefact produced by fire in the past century and a half (the false macchia of Acocks, 1953), or else accept the view that fire has always occurred sooner or later, enabling the persistent geophytes, hemicryptophytes and geoxylic dwarf shrubs and half shrubs to develop fully and to flower. In view of the slowness with which aliens and ruderals have entered the flora, the abundance of the fire-resistant life-forms and the apparent stability of the vegetation types over a period greater than 20 years (the units recognised by the present author appear to have been present in the vegetation studied by Scott and Liebenberg), the former view becomes more difficult to accept than the latter, and I consider that fire should be regarded as a natural factor of this region. The frequency of its occurrence is another matter. In a further paper, the effects of fire on the vegetation of the Grahamstown Nature Reserve will be studied more fully.

### SUMMARY

The vegetation of the Grahamstown Nature Reserve consists of heath, grassland, woodland and low forest formations, with very small areas of hygrophytic and helophytic communities. The plant communities are grouped according to successional status and physiographic features of the sites they occupy. At present no attempt is made to classify the communities as associations, as the vegetation of the large area of central Albany, of which the Reserve forms a part, has not been examined in the same detail. However, it is known that many of these groupings do in fact occur throughout the whole semi-mountainous Witteberg region.

The inherent physiographic instability of the area is expressed in soil creep, slumping (solifluction in the widest sense) and gullyng, and the vegetation of the more unstable sites is considered in terms of a balance of upgrade and downgrade tendencies resulting in successional cycles.

Nonetheless, the vegetation is essentially stable, despite the steep slope and areas of prisme are few. It is suggested that several seres are involved, corresponding to the physiography of the sites. Evidence indicates that forest does not at present occupy all the sites which are potentially suited to it, but is tending to spread. Similarly, heath tends to invade grassland. Despite this, it is shown that the life-form spectrum of the area is not dominated by phanerophytes, but by chamaephytes, hemicryptophytes and geophytes. It is suggested that in this region, which is climatically marginal to the winter rainfall area in which the Cape heath or sclerophyll reaches its fullest expression, it is the susceptibility of the taller heath species to winter drought and more especially to winter heath fires which has led to the predominance of life-forms which are more fire resistant.

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# NOTES ON THE ALOES OF ARABIA WITH DESCRIPTIONS OF SIX NEW SPECIES

J. J. LAVRANOS

(With Plates X–XVI)

The first botanist to explore parts of Arabia and to collect Aloe there was Forskal who accompanied an expedition which visited the Yemen on instructions of Frederick V., King of Denmark. Forskal began his travels at Lohayya, on the Red Sea coast, late in 1762 and covered a considerable area in the Yemen. He died of a fever on 11 July 1763, in tragic circumstances, and was buried in Yarim on the Yemeni highlands. His work was published posthumously by Carsten Niebuhr in *Flora Aegyptiaco-Arabica*, (1775).

No Aloes were collected in Arabia after Forskal until 1887, when Deflers visited the Yemen and later, in 1890, 1893 and 1894, the Aden hinterland. He described one new species and made reference to others but, like most of his successors, he assigned to "*Aloe vera*" or its varieties, a large number of forms which the present writer has collected and found to be specifically distinct.

Schweinfurth travelled extensively in the Yemen in 1889 and collected many Aloes. He described two new species and two varieties.

Th. Bent visited the Hadhramaut in 1893–4 on an archaeological mission. He was accompanied by Lunt, a gardener from Kew. Three forms of Aloe were collected, of which one was described as *A. luntii* Bak.

Dr. C. Rathjens and Prof. H. von Wissmann carried out the first of their journeys to Southern Arabia in 1927–8 for the purpose of geographical research. Rathjens returned to the Yemen in 1931 in which year von Wissman travelled in the company of Mr. D. van der Meulen to the Hadhramaut. Later that year he explored the areas around Qataba and Dhala alone; he then went back to Sanaa in the Yemen. Rathjens returned to that country in 1934 and once again in 1939, in which year von Wissmann and van der Meulen made their journey overland from Aden to the Hadhramaut. A considerable volume of Aloe material was gathered during these journeys. No new species was based on it and Dr. O. Schwartz, who worked on the collections of Rathjens and von Wissmann, followed Deflers and Schweinfurth in ascribing a large number of specimens to the ubiquitous "*Aloe vera*. var. *officinalis*."

In recent years, and prior to the present author's journeys to Arabia, there have been sporadic gatherings of Aloe, such as those of Mr. D. Vesey-Fitzgerald in Asir (Saudi Arabia), Mr. Ken Guichard, Captain W. J. Waring and Professor Gilliland in the South Arabian Federation and the Hadhramaut, and Col. D. de C. Smiley and Mr. W. M. M. Deacock in the Jebel Akhdhar area of Oman. One new species has been based on these collections, *Aloe gillilandii* described by Dr. G. W. Reynolds.

The present author visited south western Arabia and the Hadhramaut in August 1962 and, again, accompanied by Professor Dr. W. Rauh, in March 1964. Much Aloe material was collected on both journeys and it is on this that the new species here described were founded.

The known distribution of the genus *Aloe* in Arabia thus extends from the high mountains of the Asir, in the north-west, throughout the coastal hills, highlands and mountain ranges, constituting the southern fringe of Arabia, to the alpine folded range of Jebel Akhdhar in the east. The latter locality, which is in the region of latitude 23°N., longitude 58°E., marks the farthest known north and east for the distribution of the genus.

The species of Aloe from Arabia first described by Forskal (*l.c.*) are the following:

1. *A. maculata* Forskal in *Fl. Aeg. Arab.* 73, (1775); Schweinfurth in *Bull. Herb. Boiss.* 2, app. 2, 59 (1894); Baker in *Journ. Linn. Soc.*, 175 (1880), from Lohaja (Lohayya) in the Yemen. The flowers are stated to be yellow, the leaves a foot long, the inflorescence six feet high. No other information is given. Berger queries whether *A. maculata* should be referred to a variety of *A. vera* L. (the correct name of which is *A. barbadensis* Mill.). Schweinfurth (*l.c.*) reduced this species into synonymy under "*A. vera* var. *officinalis*", while Baker (*l.c.*) queries it as a synonym of *A. abyssinica* Lam. In view of the very incomplete description and the total absence of herbarium material *A. maculata* Forsk. should be regarded as a *species non satis cognita* and dropped.

2. *A. officinalis* Forskal, in *Fl. Aeg. Arab.* 73, (1775); Defflers in *Voyage au Yemen*, 211 (1889), in *Esq. Geogr. Bot.* (1895); *A. vera* L. var. *officinalis* (Forsk.) Baker, in *Journ. Linn. Soc.* 18, 176 (1880); Schweinfurth in *Bull. Herb. Boiss.* 159 (1894); Berger in *Pflanzenr. Liliac. Aloin.* 229 (1908); O. Schwartz in *Beitr. z. Kenntn. d. Fl. S. W. Arab.* 181 (1934), in *Fl. Trop. Arab.* 350 (1939); Blatter in *Fl. Arab.* 464 (1936). From Wadi Mor near Lohayya (Lohaja) in the Yemen. The flowers are described as red, cylindric-trigonus (tereto-triquetri); the perianth-segments are said to have reflexed apices; the inflorescence is described as "sometimes bifid" and it may hence be assumed to be usually simple; its height is given as two cubits (bicubitalis) i.e. as somewhere between 90 and 110 cm.

Baker (*l.c.*) reduces this taxon to *A. vera* L. var. *officinalis* (Forsk.) Bak.



under which he includes *A. rubescens* D.C. Schweinfurth adopts Baker's view and gives the following localities: Yemen. Badjil (200 m.) No. 531; foot of Gebel Bura near Hille (600 m.) No. 360; near Chalife to the east of Merrana (300 m.) No. 182; at foot of Gebel Melhan near Wolledje (600 m.) No. 658. Schweinfurth describes the flowers as yellowish or orange and the inflorescence as simple or often 3-branched and up to 2 m. high. There appears to be some doubt as to whether Schweinfurth's collections indeed belong to "*A. vera*. var. *officinalis*." However, until such time as both his and Forskal's localities can be revisited, it is best to include them under that species. Berger, (*l.c.*) follows Schweinfurth in both description and localities but includes Stuhlmann 1125 from Zanzibar. This is an obvious error as neither *A. barbadensis* nor *A. officinalis* are known from Zanzibar. Stuhlmann 1125 may represent *A. massawana* Reynolds, introduced from Eritrea.

Finally, O. Schwartz (*l.c.*) lists various collections made by Delflers, Paulay and von Wissmann in the Yemen, the hinterland of Aden and the Hadhramaut under "*A. vera* var. *officinalis*."

It is impossible, in the light of our present knowledge of the genus *Aloe* to follow Baker in his classification of this species. *A. barbadensis* Mill. (which is the correct name for "*A. vera* L.") while related to Forskal's plant in several respects, has characteristically ventricose perianths which cannot be described as "teretetrquetrous", and are not at all constricted above the ovary. Schweinfurth moreover, describes the pedicels of *A. officinalis* as 6-8 mm. long, and the anthers and stigma as scarcely exerted, while in *A. barbadensis* the pedicels are shorter and the anthers and stigma exerted by up to 5 mm.

In view of the above differences and of the obscurity surrounding the origin of *A. barbadensis* Mill. (= "*A. vera* L.") the present writer has decided to maintain the specific status of Forskal's plant. The name *A. officinalis* Forsk. is, therefore, upheld.

Berger (*l.c.*) includes *A. rubescens* DC.—*Hist. Pl. Grass.* t. 15 (1799)—under *A. officinalis*. While there may be some resemblance between the two species in habit and form of leaves, *A. rubescens* is depicted as having a rather short, laxly flowered inflorescence and perianths which are campanulate and very prominently stipitate, the stipus tapering into the pedicel. These characters seem to be alien to *A. officinalis* as described both by its author and by Schweinfurth. Southern Arabia was, in the 18th century, a very inaccessible region and the home of De Candolle's species—for which no habitat data are available—may well have been in Africa. *A. rubescens* DC. should be regarded as distinct from *A. officinalis* Forsk.

3. *A. variegata* Forsk. (*non* L.), in *Fl. Aeg. Arab.* 74 (1875); no locality is given and there is no description of the flowers. Moreover, the epithet was occupied. This species must be dropped.

4. *A. pendens* Forsk., *Fl. Aeg. Arab.* 74 (1775) Baker in *Journ. Linn. Soc.* 18, 181 (1880). Schweinfurth in *Bull. Herb. Boiss.* 2, app. 2, 72 (1894); Engler in *Notizbl. Berl. Bot. Gart.* 5 (1897); Berger in *Bot. Mag.* 7837 (1902); in *Pflanzenr. Liliac.-Aloin.* 272 (1908); Blatter in *Fl. Arab.* 464 (1936); Christensen in *Dansk. Bot. Ark.*, 4, No. 3, 18 (1922); O. Schwartz in *Fl. Trop. Arab.* 350 (1939). The type locality of this species is given as Hadie, in the Southern Yemen mountainland. It was later collected by Schweinfurth at various places on the Western escarpment of the Yemen. A plant collected by H. St. J. Philby at Arif, Asir province, Saudi Arabia (B.M.—No. 46), appears to belong to this species.

5. *A. inermis* Forsk., *Fl. Aeg. Arab.* 74 (1775); Baker in *Journ. Linn. Soc.* 18, 181 (1880); Berger in *Pflanzenr. Liliac.-Aloin.* 268 (1908); Blatter in *Fl. Arab.* 463 (1936); O. Schwartz in *Fl. Trop. Arab.*, 351 (1939); Christensen in *Dansk. Bot. Ark.* 4 No. 3, 18 (1922); Reynolds in *Journ. S. Afr. Bot.* 24, 173 (1958); *A. luntii* Bak., in *Kew Bull.* 342 (1894), in *Bot. Mag.* t. 7448 (1895). This species was collected at various points in the Southern Yemen, while the form described as *A. luntii* occurs in the Hadhramaut. The present author has also found *A. inermis* growing in considerable numbers in the Wadi Hardaba in the Haushabi and Amiri country of South Western Arabia, the red-flowered form being most frequent while one with yellow flowers was collected at the foot of the Khureba Pass. The species was, furthermore, found by Mr. Bally and Dr. Reynolds at Las Anod, Taleh and Halin in Northern Somalia—(formerly Somaliland Protectorate.)

6. *A. vacillans* Forsk., *Fl. Aeg. Arab.* 74 (1775); Schweinfurth (errone *vaccillans*) in *Bull. Herb. Boiss.*, 2, App. 2, 65 et 109 (1894); Berger in *Pflanzenr.*, Liliac.-Aloin., 227, (1908); O. Schwartz, *Fl. Trop. Arab.* 350 (1939); Blatter in *Fl. Arab.* 463, (1936); Christensen in *Dansk. Bot. Ark.*, 4, No. 3, 18 (1922). The type locality is given as Kurma, in the mountains of the Southern Yemeni escarpment. Schweinfurth collected this species at various points along the Yemeni escarpment, while von Wissmann gathered it near Izz, in the interior of the Yemen.

In his various papers covering his journeys, Deflers refers repeatedly to *Aloe* but attributes most of the plants which he observed to "*A. vera*". He described only one new species, *A. tomentosa* Defl., in *Voyage au Yemen* 211 (1889), from the slopes of the Jebel Hadhur Nabi Shwaib, West of Sana'a in the Yemen, a mountainous area enjoying a high rainfall; *vide* also Berger, *Pflanzenr.*, 232 (1908) Blatter, *Fl. Arab.* 464 (1936); O. Schwartz, *Fl. Trop. Arab.* 350 (1939) and Reynolds, *Journ. S.A. Bot.* 24, 166 and 173 (1958). Deflers describes his species as shrubby (fruticosa) and its inflorescence as many-branched. The plants from Moledera in Northern Somalia ascribed by Dr. Reynolds (*l.c.*) to this species are acaulous and have a 3—4-branched inflorescence. In view of these differences, the present writer wishes to query whether

the plants from Somalia do not represent a species distinct from *A. tomentosa* Defl. It is to be hoped that Defler's type locality may be revisited, when this problem might be solved. Vesey-Fitzgerald No. 16076/6 from Suda in Asir (Saudi Arabia), now at the British Museum (Natural History), may belong to *A. tomentosa*.

Schweinfurth described two new species plus two varieties of Aloe from Southern Arabia. Of the two varieties one was raised to specific status by Blatter (*l.c.*), the other had to be referred as a variety under a species other than the one chosen by its author. The Aloes first described by Schweinfurth from Arabia are the following:

1. *A. rubroviolacea* Schweinf. in *Bull. Herb. Boiss*, 2 app., 2, 71 (1894); Engler in *Notizbl. d. Berl. Bot. Gart.* 1, 5 (1897); Hook f. in *Bot. Mag.* t. 7882 (1903); Berger, in *Pflanzener*, Liliac-Aloin. 296 (1908); Blatter in *Fl. Arab.* 464 (1919-36); O. Schwartz in *Fl. Trop. Arab.* 351 (1939). From high altitudes on the Western Escarpment of the Yemen.

2. *A. sabaëa* Schweinf. in *Bull. Herb. Boiss*, 2, app. 2, 74 (1894); Berger in *Pflanzenr.*, Liliac-Aloin. 320 (1908); Blatter in *Fl. Arab.* 463 (1936); O. Schwartz in *Fl. Trop. Arab.* 351 (1919). A tree from the foothills of the Yemeni escarpment.

3. *A. menachensis* (Schweinf.) Blatter in *Fl. Arab.-Rec. Bot. Surv. Ind.* 463 (1936); Lavranos in *Journ. S.Afr. Bot.* 30, 2, 83 (1964); *A. percrassa* Schweinf. (non Todaro) var. *menachensis* Schweinf. in *Bull. Herb. Boiss*, 2, app. 2, 64 (1894); *A. trichosantha* Berger var. *menachensis* Schweinf. in *Pflanzenr.*, 38, 232 (1908); O. Schwartz in *Fl. Trop. Arab.* 351, (1939). From the Jebel Haraz on the Western Yemeni escarpment.

4. *A. officinalis* Forsk. var. *angustifolia* (Schweinf.) Lavranos, comb. nov.; *A. vera* L. var. *angustifolia* Schweinf. in *Bull. Herb. Boiss*, 2, app. 2, 62 (1894); Blatter in *Fl. Arab.* 464 (1936); O. Schwartz in *Fl. Trop. Arab.* 350 (1939). From the foothills of the Western Yemeni escarpment. Schweinfurth (*l.c.*) queries whether this might not be merely a variable form; he states that it closely resembles "*A. vera* var. *officinalis*". Since the author, for reasons set out above, considers the latter to be a species in its own right, the var. *angustifolia* must be combined as a variety of *A. officinalis* Forsk. Future research at the type locality may lead to the ultimate rejection of this variety but, in spite of present doubts, it would be inadvisable to do so now.

Only two further species of aloe were described from Arabia, namely *A. gillilandii* Reynolds in *Journ. S.A. Bot.* 28, 4, (1962) and *A. lavranosii* Reynolds in *Journ. S.A. Bot.* 30, (1964).

The first of these species occurs within a limited altitudinal range over wide tracts along the southern escarpment between Taizz in the west and Habban in the east. The other is rare on the Amiri highlands of S.W. Arabia.

The present writer, accompanied in 1962 by Mr. C. Meintjes, and in 1964 by Professor Dr. W. Rauh, investigated the Aloes which grow in south-western Arabia and the Hadhramaut. Every accessible region was visited within the time available and, although the research is by no means complete, our knowledge regarding the Arabian section of Aloe has been considerably enlarged.

It thus appears that there are at least 20 species and varieties of Aloe growing in Arabia. Of these, nine seem to be undescribed, with one possible exception, while the 10 named species and the one named variety are:

1. *A. officinalis* Forskal.
- 1a. *A. officinalis* Forsk. var. *angustifolia* (Schweinf.) Lavranos.
2. *A. vacillans* Forsk.
3. *A. menachensis* (Schweinf.) Blatter.
4. *A. tomentosa* Defl.
5. *A. inermis* Forsk.
6. *A. pendens* Forsk.
7. *A. rubroviolacea* Schweinf.
8. *A. sabaia* Schweinf.
9. *A. gillilandii* Reynolds.
10. *A. lavranosii* Reynolds.

Of the nine remaining species two are being cultivated in Johannesburg and elsewhere and flowers are awaited before their identity can be ascertained. Of these, the one from near Jidma, 25 miles North of Mukalla in the Hadhramaut, is acaulescent, forms groups of several rosettes and has ensiform, extremely thick leaves up to 60 cm. long and 6—7 cm. broad. The other, from the edge of the Audhali Escarpment in the Aden hinterland, is a solitary plant with a short, procumbent stem and a large rosette which invariably lies on its side; its flowers are said to be yellow.

A third species, not well enough known to permit a diagnosis was, as previously stated, collected at an altitude of approx. 1,000 ft. (300 m.) in the Sumail gap which separates the Jebel Akhdhar from the mountains of the Sharqiya (Col. D. De C. Smiley, s.n. coll. Nov. 1959, in B.M.) This may represent the same species as the material collected at 6,000—8,500 ft. (1,800—2,600 m.) on the Jebel Akhdhar (W. M. M. Deacock No. 19, coll. Jan. 1959, in B.M.)

These plants from the Sumail gap appear to have yellow (or perhaps red) ventricose perianths and, so far as the herbarium material and habitat photographs permit one to say, they are hardly distinguishable from *A. barbadensis* Mill. (= *A. vera* L.). Dr. G. W. Reynolds (*in litt.*) points out that, according to Dioscorides who described the common Drug Aloe in the first century A.D., this plant is found in India and also in Arabia, etc. Dr. Reynolds queries whether the Omani plants might be the same as *A. indica* Royle which was





PLATE X

*Aloe dhalensis* Lavranos.

Plant from Dhala on the Amiri highlands flowering in Johannesburg. Height 80 cm. Flowers 1/1, from bud to post-pollination stage.

Photos: Dr. G. W. Reynolds.



described from the N.W. provinces of India and has been reduced into synonymy under *A. barbadensis* Mill.

The south-eastern corner of Arabia, wherein the Jebel Akhdhar lies, receives its rainfall in winter. Its vegetation, on the whole appears to be more closely related to that of Beluchistan, Iran and the Mediterranean regions of North Africa and Arabia, than to that of the western portion of Southern Arabia. It also lies—in the wider sense—within that region of the world whence many of the medicinal and aromatic plants used by the ancients originated.

Such being the case, it is possible that the mountains of South East Arabia (and perhaps the neighbouring area of Iran), were the original home of *A. barbadensis* Mill. (= *A. vera* L.) and that this plant, valued for its medicinal properties, was spread, by human hand, along the incense and spice routes of the ancient world, to the east and to the west of its original habitat. It may, thus, have attained its present, almost cosmopolitan distribution. It is, perhaps, no mere coincidence that *A. barbadensis* thrives mostly in warm temperate regions with a winter rainfall and, generally, a climate reminiscent to that prevailing in the mountains of Oman.

Six new species can now be described. In doing this and in view of my long co-operation with Mr. D. S. Hardy of Pretoria in matters concerning the genus *Aloe*, I have joined this name to my own as co-author of one of the new species.

***Aloe dhalensis*** Lavranos. Nova species affinis *A. vacillanti* Forsk., sed foliis minoribus, inflorescentia valde brevior, perianthio luteo differens.

*Planta* solitaria vel sobolifera, acaulis vel cauli valde brevi munita; *folia* ad 18, erecta vel adscendentia, apice acuta, ca. 40 cm. longa, basi 8 cm. lata 5—8 mm. crassa; *supra* glauca, non maculata leviter canaliculata; *subtus* convexa; foliorum margines dentibus brunneis pungentibus, deltoideis, 2—3 mm. longis, 5 mm. inter sese distantibus armati; *inflorescentia* simplex vel saepe 3-vel 4-ramosa, a 70 cm. alta, ramis adscendentibus; *pedunculus* basi plano-convexus, ca. 12 mm. latus, deinde teres; *racemi* anguste conico-cylindrici, 19 cm. longi, 7 cm. diam., subdensi; *bractee* lanceolatae, acutae, 11 mm. longae, 5 mm. latae, albidae, valde scariosae, 7—9-nerviae; *pedicelli* citrei, 5 mm. longi; *perigonium* citreum, 30 mm. longum, sub-cylindricum, supra ovarium 6 mm. diam., segmentibus exterioribus per 10 mm. liberis, obscure trinerviis, apicibus sub-acutis, leviter recurvatis, segmentibus interioribus latioribus; *filamenta* albida, filiformia, complanata; *antherae* demum per 2—3 mm. exsertae; *stigma* demum 3 mm. exsertum; *ovarium* olivaceum, 6 mm. longum, 2½ mm. diam. (Plate X.)

**HABITAT:** South-Western Arabia, Amiri Highlands near Dhala, alt. appr. 4,800 ft. (1,460 m.) lat. 13° 42'N., long. 44° 44'E., coll. Ken Guichard, 1949,

fl. Johannesburg 26 April 1953, Reynolds 6227 holotype (PRE); foot of castle hill at Dhala, 4,950 ft., 24 August 1962, Lavranos 1885; on Jebel Jihaf, 6,500 ft. 25 August 1962, Lavranos 1884; near Dhala air-strip, 4,800 ft. 10 July 1964, J. H. Gross in Lavranos 3393.

#### DESCRIPTION

*Plant* solitary, or producing off-shoots, acaulous or with a short, usually erect stem.

*Leaves* about 18, erect to ascending-erect, densely rosulate, lanceolate, tapering to a rather acute apex, about 40 cm. long, 8 cm. broad at base, 5–8 mm. thick; *upper surface* glaucous-green, sometimes with light brown tinge, uni-coloured, flat or slightly canaliculate; *lower surface* same in colour as the upper, convex; *margins* armed with brown, pungent, deltoid teeth 2–3 mm. long, 5 mm. distant but more so towards the apex; *leaf-sap* dries dark purple.

*Inflorescence* simple or, more often, up to 4-branched, up to 70 cm. high.

*Peduncle* plano-convex and appr. 12 mm. broad at base, thereafter terete; sterile bracts white, lanceolate-deltoid, very scarious, many-nerved.

*Racemes* narrowly conico-cylindric, 20 cm. long, 7 cm. diam., subdensely flowered, terminated in a tuft of wilted bracts, youngest buds sub-erect, older buds spreading, open flowers pendulous.

*Bracts* lanceolate, acute, 12 mm. long, 5 mm. broad, papery, white, 7–9-nerved.

*Pedicels* lemon, 5 mm. long.

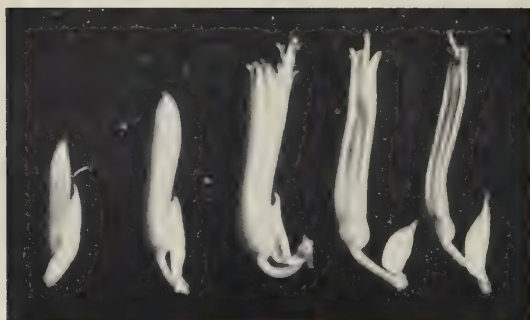
*Perianth* lemon-yellow, smooth, 30 mm. long, sub-cylindric, obtusely tapering into the pedicel at base, 6 mm. diam. over the ovary, then constricted on underside to 5 mm. diam., thereafter laterally compressed and enlarged towards the throat, the mouth wide open; *outer segments* free for 10 mm., obscurely 3-nerved, the nerves greenish near apex, the apices sub-acute, slightly spreading, *inner segments* free but dorsally adnate to the outer to beyond the middle, broader than the outer, with 3 congested, greenish nerves forming a keel throughout their length, and with broader, more obtuse, more spreading apices.

*Filaments* almost white, filiform flattened, the 3 inner narrower and lengthening before the 3 outer, the *anthers* in turn exerted by 2–3 mm.

*Style* lemon, the stigma at length exerted by 3 mm.

*Ovary* pale olive-green, 6 mm. long,  $2\frac{1}{2}$  mm. diam.

This species was first collected in 1949 by Mr. Ken Guichard near Dhala which lies some 90 miles North of Aden, in the Amiri highlands. A plant was sent to Mr. P. R. O. Bally at Nairobi and then forwarded to Dr. G. W. Reynolds, in whose care it first flowered on the 26 April 1953. Dr. Reynolds drew up a full description of this young plant and I have taken over much of this in



## PLATE XI

*Aloe audhalica* Lavranos et Hardy.

A young plant from Wadi Salul, Audhali Plateau, flowering at Bryanston, Johannesburg. Height 50 cm. Flowers 1/1, from bud to post-pollination stage.

compiling the present paper, particularly so as I did not find the species in flower.

When I visited Dhala in August 1962, the plants were not flowering. It appears that in their natural habitat they do so in October or November. *A. dhalensis* seems to be widespread on the Amiri highlands where it occurs in scattered colonies between approx. 4,000 feet at the top of the Khureiba Pass, East of Dhala, to 6,500 feet on the slopes of Jebel Jihaf. The area of its distribution probably extends in the direction of Ta'izz.

These high plateaux enjoy a mild climate and an annual rainfall averaging some 350 mm., which falls mainly between April and September. The vegetation consists mainly of thorn scrub in which *Acacia tortilis* (Forsk.) Hayne, and a *Euphorbia* of sect. *diacanthium* predominate.

It may be noted here that von Wissmann's collections listed by O. Schwartz (*Fl. Trop. Arab.*, 350 (1939) under numbers W827 and W2397 as belonging to *A. officinalis* Forsk. no doubt represent *A. dhalensis*.

*A. dhalensis* appears to be more closely allied to *A. vacillans* Forsk., than to any other of the species hitherto described. It is however, a much smaller plant with inflorescences reaching 70 cm. in height as compared with those of *A. vacillans* which are stated to be up to 2 m. tall; moreover, in the new species the inflorescence is, more often than not, 3-branched. It may finally be noted that *A. dhalensis* is usually stemless or has a very short, erect stem while its ally often has a decumbent stem.

**Aloe audhalica** Lavranos et Hardy. Nova species, affinis *A. vacillanti* Forsk., sed foliis brevioribus latioribusque, inflorescentia valde brevior, recemis brevioribus densioribusque, pedicellis a 10 mm. longis differt.

*Planta* fere solitaria; folia tenus 30, deltoidea, acuta, a 45 cm. longa basi 15 cm. lata, supra plana, apicem versus leviter canaliculata, unicoloria, glaucoviridia vel roseobrunnea, asperiuscula; *subtus* convexa, marginibus roseis, cartilagineis, dentibus fusco-brunneis, pungentibus, strictis, tenus 4 mm. longis, 4—6 mm. distantibus armata; *inflorescentiae* 80—100 cm. altae, fere 3—4-ramosae; *pedunculi* basi plano-convexi, deinde teretes; *racemi* late conici, 18—22 cm. longi, 5 cm. diam., mediocriter densiflori; *bracteae* ovatae-delloideae, acutae, 16 cm. longae, basi 5 mm. latae, albidae, nervis 7, rubris ornatae; *pedicelli* rubri, teretes, 10 mm. longi; *perigonio* coccinea, stricta, cylindricotriquetra, 30 mm. longa, supra ovarium 6 mm. diam., deinde vix constricta, segmentibus exterioribus per 8 mm. liberis, 3-nerviis, interioribus latioribus; *filamenta* flavida, *antherae* deinceps per 3—4 mm. exsertae, *stigma* demum per 4 mm. exsertum; *ovarium*, luteo-virens, 6 mm. longum, 3 mm. diam. (Plate XI.)



**HABITAT:** South-Western Arabia, Audhali Plateau; near Mukeiras, 6,900 ft. (2,100 m.) lat. 45° 41'N., long. 13° 56'E., coll. 25 Dec. 1961, fl. Johannesburg, April 1964, Meintjes in Lavranos 1652, (PRE) holotype; Mukeiras, 16 Aug. 1962, Lavranos 1817; Karish, 7,100 ft. (2,160 m.) 18 Aug. 1962, Lavranos 1896; Wadi Idhi, 6,800 ft. (2,070 m.) 4 March 1964, Rauh et Lavranos 2789; Wadi Salul, 6,800 ft. (2,070 m.) 5 March 1964, Rauh et Lavranos 2800.

#### DESCRIPTION

*Plant* usually solitary, occasionally forming groups of several rosettes.

*Leaves* up to 30, deltoid-acute, densely rosulate, ascending-erect, to 45 cm. long, 15 cm. broad at base; *upper surface* flat but somewhat canaliculate towards, the apex, somewhat rough, uniformly glaucous-green when in complete shade, otherwise pinkish-brown; *lower surface* convex, same in colour as the upper surface; *margins* with a continuous, pink cartilaginous border armed with pungent, straight, dark brown teeth, up to 4 mm. long, 4–6 mm. distant.

*Inflorescence* 80–100 cm. high, up to 4-branched from about the middle.

*Peduncle* at base plano-convex, terete upwards, grey-brown with a bloom, sterile bracts deltoid, acute, to 15 mm. long, 5 mm. broad at base, 7-nerved, white, scarious.

*Racemes* 18–22 cm. long, about 5 cm. diameter, cylindric-acuminate, rather densely flowered.

*Bracts* ovate-deltoid, acute, 15 mm. long, 5 mm. broad at base, pinkish-white, 7-nerved, the nerves red.

*Pedicels* red, terete, 10 mm. long.

*Perianth* glabrous, straight, cylindric-trigonus very slightly constricted above the ovary, scarlet, 30 mm. long, 6 mm. diameter over the ovary; *outer segments* free for 8 mm., 3-nerved with creamish margins, *inner segments* broader than the outer, cream with 3 contiguous nerves which become confluent and brown at the segment-apices.

*Filaments* cream, the 3 inner narrower and lengthening before the 3 outer the *anthers* in turn exerted by 3–4 mm.

*Style* cream, the *stigma* at length exerted by 4 mm.

*Ovary* truncate, yellowish-green, 6 mm. long, 3 mm. broad at base.

*Sap* clear, drying reddish-brown.

*A. audhalica* is widespread in rocky, sunny places throughout the Audhali plateau at altitudes exceeding 6,650 ft. (2,000 m.) Its distribution probably extends into the adjacent district of Beidha. It is a circumstance worthy of note that this species, while widely distributed on the plateau itself was nowhere found within less than half a mile from the edge of the escarpment which, in turn, is the habitat of another species as yet unidentified. In its habitat which enjoys an average annual rainfall of some 12 inches and is subject to occasional<sup>1</sup>



PLATE XII

*Aloe niebuhriana* Lavranos.

Plants in large numbers on rocky hill, south of Tor al Baha.  
Subaihi country. Height 1-20 m.

Photo: Lavranos

Flowers red, 1/1, from bud to post-pollination stage

Photo: Dr. G. W. Reynolds

frosts during the winter months, *A. audhalica* grows in exposed positions in association with various low Acanthaceae and Labiatae, *Dracaena serrulata* Bak., *Euphorbia balsamifera* Ait., *Caralluma quadrangula* (Forsk.) N.E.Br., *C. plicatiloba* Lavranos, etc., It is nowhere common but is found in isolated individuals or small groups.

*A. audhalica* seems to be rather closely allied to *A. vacillans* Forsk., which was collected at various places in the central region of the Western Yemeni escarpment. *A. vacillans* however, differs in the shape of its leaves, which are longer and narrower, in having inflorescences 1.5—2 m. tall, while its racemes are said to be 35—40 cm. long and more laxly flowered and finally by the fact that its flowers are described by Forskal as subsessile, while Berger attributes to the pedicels a length of 5—7 mm.

Of all the Aloes which I collected in Southern Arabia the one here described has been the most difficult to identify. While our knowledge of *A. vacillans* Forsk. remains incomplete, I consider it advisable to assign specific rank to this form from the Audhali Plateau.

**Aloe niebuhriana** Lavranos. Nova species, affinis *A. trichosanthae* Berger. sed foliis plus numerosis, maculatis, inflorescentia brevior, plerumque simplicis, racemis brevioribus, segmentis exterioribus perianthii per 19—21 mm. liberis differt.

*Planta* succulenta, fere sobolifera, acualis vel caule brevi, procumbente; *folia* 15—25, rosulata, erecto-patula, lanceolata-attenuata, a 45 cm. longa, basi 10 cm. lata, 5—8 mm. crassa, *supra* glauco-viridia, brunneo-tincta, late canaliculata, *subtus* convexa; *margines* foliorum dentibus fusco-brunneis saepe acutis, 1.5—2 mm. longis, 12—15 mm. distantibus armati; *inflorescentiae* 50—100 cm. altae, simplices vel rarius 1-vel 2-ramosae, ramis brevibus, arcautis-adscendentibus; *pedunculi* basi plano-convexi 15 mm. lati, deinde teretes; *racemi* densiflori late conici, 12—30 cm. longi, 5—6 cm. diam.; *bracteae* anguste deltoideae, acutae, 8 mm. longae, basi 3—4 mm. latae, albidae, scariosae, 5—7-nerviae; *pedicelli* rubri vel flavovirides, teretes, fere minute pubescentes, rarius glabri, 4—6 mm. longi; *perigonium* rubra (vel interdum flava) plerumque pubescentia, rarius omnino glabra vel apicibus segmentum papilloso-tomentosis, cylindrico-campanulata, 28—31 mm. longa, 6—7 mm. diam., ad orem parum constricta, segmentibus exterioribus per 19—21 mm. liberis, trinerviis, apice recurvatis, interioribus latioribus; *filamenta* flava filiformia, complanata; *antherae*, demum per 3—4 mm. exsertae; *stigma* aetatae exsertum per 4 mm; *ovarium* 6 mm. longum, 2.5 mm. diam. (Plates XII and XIII.)

**HABITAT:** South Western Arabia; Am Rija (Da'ar al Kudeimi) in the Subaihi country, 1952, Gilliland in Reynolds 6362, fl. Johannesburg January 1960; Haushabi country, 5 miles south of al Milah, 1,200 ft. (350 m.), 13° 45'N., 44° 50'E., 24 Aug. 1962, Lavranos 1863; Subaihi country, on rocky slope near

Tor al Baha, alt. appr. 1,200 ft. (350 m.), lat. 13° 10' N., long. 44° 19' E., 31 March 1964, Rauh et Lavranos 3159, holotype (PRE), isotype (K); Da'ar al Kudeimi, 800 ft. (250 m.), 31 March 1964, Rauh et Lavranos 3156, perianths scarlet, glabrous; 3 miles south of Tor al Baha, 31 March 1964, Rauh et Lavranos 3168, perianths yellow, glabrous, (PRE, K) and Rauh et Lavranos 3169, perianths scarlet, pubescent; 4 miles south of Tor al Baha, 31 March 1964, Rauh et Lavranos 3170, perianths papillose tomentose.

#### DESCRIPTION

*Plant* usually, when growing in soft, sandy soil, suckering freely and forming dense groups but when growing on rocky ground, usually solitary, acaulous or with a short procumbent stem.

*Leaves* 15—25 rosulate, spreading or ascending-spreading, lanceolate-attenuate, tapering to an acute, dentate apex, up to 45 cm. long, 10 cm. broad at base, 5—8 cm. thick; *upper surface* uniformly grey-green with a purplish tinge, broadly canaliculate throughout; *lower surface* same in colour as the upper, convex; *margins* armed with dark brown, blunt or acute teeth, 1·5—2 mm. long, 12—15 mm. distant.

*Inflorescence* 50—100 cm. high, usually simple, sometimes 1- or 2-branched from its upper third, the branches short, arcuate-ascending.

*Peduncle* flattened and about 15 mm. broad at base, terete upward, purplish-green with a bloom, minutely pubescent in its terminal portion, less often glabrous throughout; sterile bracts below the racemes whitish, many nerved, deltoid, 8 mm. long, 6 mm. broad at base.

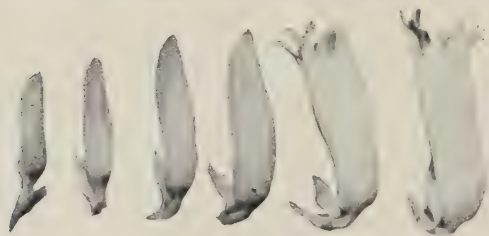
*Racemes* rather broadly conical, 12—30 cm. long, 5—6 cm. diameter, densely flowered, youngest buds suberect, older buds horizontally spreading, open flowers nutant.

*Bracts* narrowly deltoid, acute, 8 mm. long, 3—4 mm. broad at base, whitish scarious, 5—7-nerved.

*Pedicels* red or greenish-yellow, terete, usually minutely pubescent, less often glabrous, 4—6 mm. long.

*Perianth* scarlet (or rarely greenish yellow), with greenish yellow segment apices, usually shortly pubescent throughout, less frequently glabrous or papillose-tomentose on the free part of the outer perianth-segments, cylindric-campanulate, shortly stipitate, 28—31 mm. long, 6—7 mm. diameter throughout their entire length, the mouth slightly constricted; *outer segments* free for 19—21 mm. with 3 nerves which are red, (or rarely yellow) low down, becoming bright green and confluent towards the recurved segment-apices; *inner segments* broader and more recurved than the outer, free but dorsally adnate to the outer, yellow with 3 nerves which are red (or rarely yellow) low down becoming bright green upward.





## PLATE XIII

*Aloe niebuhriana* Lavranos.

Photograph of plant near Da'ar al Kudeimi, Subaihi country, showing the characteristic branching of the inflorescence. Height 90 cm.

Photo: Prof. W. Rauh

Flowers 1/1, of the yellow-flowering form, from bud to post-pollination stage.



*Filaments* yellow, filiform-flattened, the three inner narrower and lengthening before the outer, the *anthers* in turn exerted by 3—4 mm.

*Style* yellow, the *stigma* at length exerted by 4 mm.

*Ovary* 6 mm. long, 2.5 mm. diameter.

*A. niebuhriana* grows in the hot, arid foothills which lie between the mountain ranges of the interior and the wide coastal plain in the Western part of the Aden hinterland. It also occurs in the low-lying valleys which dissect the seaward ranges of the mountains. It is a dominant component of a semi-desert vegetation in which its chief associates are *Salvadora* cf. *persica* Garcin, *Euphorbia qarad* Defl. *Tamarix articulata* Vahl, *Zizyphus spina-christi*. (L) Willd., various species of *Commiphora* etc. It was not observed above 1,500 ft. (500 m.). In contrast to all other species of *Aloe* native to the Southern fringe of Arabia (with the possible exception of *A. inermis* Forsk.) *A. niebuhriana* is most prolific in its natural habitat, forming large and dense colonies.

The closest ally of this species appears to be *A. trichosantha* Berger, from Eritrea and Ethiopia which, however, differs in having less numerous, usually spotted, leaves with much larger marginal teeth and much taller and usually 3-branched inflorescences. In the new species the racemes are usually broadly conical and average only 20 cm. long on average, while the young buds are not hidden by the bracts which are 8 mm. long. Finally the perianths in *A. niebuhriana* are more campanulate and less slender than in its ally, being rather constricted at the mouth; the outer segments are free for two-thirds of their length while in *A. trichosantha* their free portion represents less than one-half of their length.

While in *A. niebuhriana* the flowers open, as in most other species of *Aloe*, from the bottom upwards, there are usually a few isolated buds at the very base of the raceme which open long after the lower portion of the raceme has finished flowering. The inflorescences are usually simple but, when they branch, they do so from their upper third only, in a fashion which may be described as dichotomous; this is clearly shown in Plate XIII.

While many plants have been named after Peter Forskal the botanist of the expedition sent to Arabia by King Frederick V of Denmark in 1762, none, it appears, were dedicated to the memory of the intrepid Carsten Niebuhr, the only member of this expedition to return to Europe. Apart from his invaluable contribution to Europe's knowledge of Arabia, Niebuhr saved for posterity a considerable part of Forskal's collections and papers and published, at his own expense, Forskal's *Flora Aegyptiaco-Arabica*. This species is named after Carsten Niebuhr as a very small tribute to his memory.

*A. eremophila* Lavranos. Nova species affinis *A. rigenti* Reynolds et Bally var. *glabrescenti* Reynolds et Bally, sed foliis brevioribus, adscendentibus, rigidissimis, inflorescentia brevior 4—5-ramosa, racemis cylindratis, comosis,

pedicellis longioribus, perianthiis glabris, prope strictis, segmentibus exterioribus perianthii per 14 mm. liberis differens.

*Planta* plerumque solitaria acaulescens vel caule brevi, procumbente; *folia* 10—22 arcuato-ascendentia, deltoidea, acuta, rigidissima, 35 cm. longa, basi 10 cm. lata, 15—25 cm. crassa, supra glauco-viridia, brunneotincta, immaculata, basi plana, deinde late canaliculata, subtus convexa; margines foliorum dentibus fuscobrunneis, pungentibus, tenus 4 mm. longis, 10—15 mm. distantibus armati; *inflorescentiae* 40—75 cm. altae, 3—5-ramosae; *pendunculi* basi bisconvexi, 15 mm. lati, deinde teretes, striati; *racemi* conico-cylindrici, a 22 cm. longi, 5 cm. diam., fere densiflori, laterales medio interdum breviores; *bractae* anguste deltoideae, 8—12-nerviae, 12 mm. longae, 5 mm. latae, albescentes; *pedicelli* teretes 7—8 mm. longi; *perigonio* coccinea, glabra, cylindrico-trigona, prope stricta, brevissime stipitata, 30 mm. longa, segmentibus exterioribus per 14 mm. liberis, apicibus leviter recurvatis, interioribus latoribus; *filamenta* flava, basi paulum complanata *anthreae* deinceps per 4 mm. exsertae; *stigma* demum per 5 mm. exsertum; *ovarium* flavo-virescens, 5 mm. longum, 2 mm. diam., apice truncatum. (Plate XIV.)

**HABITAT:** Southern Arabia, Hadhramaut, on limestone Plateau (Jol); 8 miles north of Mola Matr (which is 54 miles N.W. of the port of Mukalla) 6,400 ft. (1,900 m.) 20 March 1964, Rauh et Lavranos 3,100; near village of Fardha, approx. 20 miles N.W. of Mola Matr. 5,500 ft. (1,674 m.) 20 March 1964, Rauh et Lavranos 3103 both collected on 20 March 1964; East of Khureiba (Wadi Duan) approx. 4,500 ft. (1,375 m.) lat. 15° 02'N., long. 48° 28'E., 20 March 1964, Rauh et Lavranos 13348 (HEID) holotype, (K, PRE) isotype.

#### DESCRIPTION

*Plant* usually solitary, sometimes forming groups of 2—6 rosettes, acaulous or with a short, procumbent stem.

*Leaves* 10—22 arcuate-ascending to ascending erect, deltoid, acute, very rigid, 35 cm. long, 10 cm. broad at base, 15—25 mm. thick; *upper surface* uniformly grey-green with a brownish tinge, flat low down, broadly canaliculate upward; *lower surface* convex, same in colour as the upper surface; *margins* armed with dark brown, pungent, deltoid teeth up to 4 mm. long, 10—15 mm. distant but more crowded and smaller near base.

*Inflorescence* 40—75 cm. high, 3- to 5-branched from about the middle.

*Peduncle* biconvex and 15 mm. broad at base, terete upward, stricted, the branches terete, subtended by ovate-deltoid, many-nerved bracts 14 mm. long, 18 mm. broad; sterile bracts below the racemes narrowly deltoid-acute, 8—12 nerved, 12 mm. long, 5 mm. broad.

*Racemes* conico-cylindric up to 22 cm. long. 5 cm. diameter, rather densely flowered, terminating in a dense tuft or spike of wilted scarious bracts, the



PLATE XIV

*Aloe eremophila* Lavranos.

Plant on the Hadhrami Jol, east of Khureiba. Height 60 cm.  
Flowers 1/1, from bud to post-pollination stage.

lateral racemes often shorter, young buds sub-erect, old buds spreading, open flowers pendulous.

*Bracts* narrowly deltoid, 8—12 nerved, 12 mm. long, 5 mm. broad, white.

*Pedicels* red, terete, 7—8 mm. long.

*Perianth* rich scarlet, glabrous, cylindric-trigonus, almost straight, very shortly stipitate, 30 cm. long. 8 mm. diameter across the ovary, slightly constricted above, somewhat compressed laterally, the mouth wide open; *outer segments* free for 14 mm. with three prominent red nerves throughout their entire length, the nerves becoming confluent and brownish towards the yellowish and slightly recurved apices of the segments; *inner segments* free but dorsally adnate to and broader than the outer, creamy-yellow with 3 red nerves which become confluent and brownish toward the segment-apices.

*Filaments* yellow, somewhat flattened in their lower part, the 3 inner narrower and lengthening before the 3 outer, the anthers in turn exerted by 4 mm.

*Style* pale yellow, the *stigma* at length exerted by 5 mm.

*Ovary* yellowish-green, 5 mm. long, 2 mm. diameter, the apex truncate.

*A. eremophila* was first collected on 20 March 1964 on the Hadhrami Jol during a botanical journey from Mukalla on the coast of the Arabian Sea to the Wadi Hadhramaut. It is a plateau species and occurs in isolated individuals or small colonies at intervals of many miles, from just north of the seaward escarpment at 6,500—7,000 ft. for 100 miles to the cliffs overlooking the Great Wadi, at 3,500 feet.

In the high, southern part of its habitat it is associated chiefly with *Aloe inermis* Forsk., *Euphorbia balsamifera* Ait., *Kalanchoe teretifolia* Deff. with scrub-forest remnants consisting chiefly of *Dodonaea viscosa* L. and *Acacia tortilis* (Forsk.) Hayne. Further north, at lower altitudes, its chief associates are—besides *A. tortilis*—*Sarcostemma* cf. *stipitaceum* Forsk. and *Anisotes trisulcus* (Forsk.) Nees. Hot in summer, very cold in winter, this windswept plateau is now, for by far its greater part, a complete desert although there is much evidence that this has not always been so and that the present lack of vegetation is due to the destructive influences of man and goat.

*A. eremophila* is a close ally of the Somali species *A. rigens* Reynolds et Bally, from the typical form of which it differs by being a smaller plant with fewer, broader, shorter, deltoid leaves, shorter inflorescences, shorter more cylindric racemes, longer pedicels and totally glabrous, almost straight perianths. It differs from the variety *glabrescens* Reynolds et Bally by its shorter, less numerous, much more rigid and thick leaves, its shorter, usually 4—5-branched inflorescences, its more cylindric racemes which are invariably terminated by a tuft of white sterile bracts, its longer pedicels and bracts and its glabrous almost straight perianths the outer segments of which are free for 14 mm.

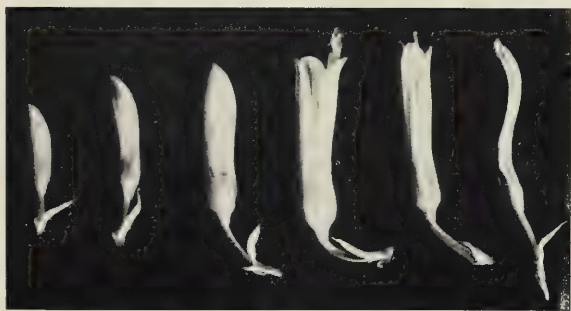


Plate XV

*Aloe serriyensis* Lavranos.

A plant from the Jebel Arays, flowering at Bryanston, Johannesburg. Height 50 cm. Flowers 1/1, from bud to post-pollination stage.



*A. serriyensis* Lavranos. Nova species, affinis *A. eremophilae* Lavranos sed foliis angustioribus, minus dentatis, lineatis-striatis, racemis laxioribus, perigonii cylindrico-campanulatis, brevioribus, prominente stipitatis, segmentis perigonium solum per 8 mm. liberis differt.

*Planta* fere solitaria, acaulis vel caule breve, decumbente; *Folia* 30—35 cm. longa, basi 6—7 cm. lata, sensim attenuata, apice acuta, 5—8 mm. crassa, obscure lineata-striata, aliquantum molla; *supra* viridia, plana vel late canaliculata; *subtus* leviter convexa; *marginēs* dentibus obtusiusculis, brevibus, cartilagineis, fusco-brunneis, 20—40 mm. inter sese distantibus armati; *Inflorescentiae* 40 cm. altae, 2—3-ramosae; *Pedunculus* basi plano-convexus, ca. 10 mm. latus, deinde teres; *Racemi* conici, 20—25 cm. longi, 5 cm. diam., laxiusculi; Bractae anguste deltoideae, 8—10 mm. longae, basi 3 mm. latae, albae, scariosae, 5-nerviae; *Pedicelli* teretes, 10 mm. longi; *Perigonia* leviter infundibuliformia, cylindrico-campanulata, prominente stipitata, roseo-coccinea, 27 mm. longa, supra ovarium 6 mm. diam., deinde vix constricta, ad orem latiora, segmentibus exterioribus per 7—9 mm. liberis, tri-nerviis, interioribus latioribus, valde recurvatis; *Filamenta* basi albida et complanata, supra flava et filiformia; *antherae* deinceps per 2 mm. exsertae; *Stigma* aetatae per 3 mm. exsertum; *Ovarium* clare viride, 4 mm. longum, 2 mm. diam. (Plate XV.)

*HABITAT*: Southern Arabia, Fadhlī country, in wooded valleys on the southern slopes of Jebel Arays around the derelict village of Serriya, alt. 1,000 ft. (300 m.) lat. 13° 29' N., long. 45° 58' E., 19 Aug. 1962, fl. Johannesburg 20 July 1964, Lavranos 2101 (PRE) holotype.

#### DESCRIPTION

*Plants* usually forming small groups.

*Leaves* 30—35 cm. long, 6—7 cm. broad at base, gradually tapering to an acute apex, 5—8 mm. thick, rather soft; *upper surface* green, sometimes with a brownish tinge, obscurely lineate-striate, flat or broadly canaliculate; *lower surface* flat to slightly convex, same in colour and texture as the outer surface, *margins* armed with short, rather blunt, horny, dark brown teeth, 20—40 mm. distant.

*Inflorescence* 40 cm. high, 2—3-branched.

*Peduncle* rather brittle, biconvex and 10 mm. broad at base, terete upwards, brown with a bloom; sterile bracts deltoid, acute, 10 mm. long, 6 mm. broad at base.

*Racemes* conical 20—25 cm. long, approx. 5 cm. diam., rather laxly flowered, usually with a long sterile, bracteate apex, young buds sub-erect, old buds spreading, open flowers pendulous.

*Bracts* narrowly deltoid, 8—10 mm. long, 3 mm. broad at base, 5-nerved, whitish, scarios.

*Pedicels* brownish, terete, 10 mm. long.

*Perianth* cylindric-campanulate, markedly stipitate and tapering into the pedicel, powdery scarlet-pink with a bloom, 27 mm. long, 6 mm. diameter over the ovary, thence scarcely constricted, the mouth wide open; *outer segments* free for 7—9 mm., with 3 red nerves which become brown and confluent towards the slightly recurved apices; *inner segments* broader than the outer, cream with strongly recurved apices.

*Filaments* whitish and much flattened at base, filiform and bright yellow in their upper portion, the *anthers* in turn exerted by 2 mm.

*Style* filiform, yellow, the *stigma* at length exerted by 3 mm.

*Ovary* bright green, 4 mm. long, 2 mm. diameter.

This species differs from *A. eremophila*, its closest ally, in being a much less robust plant. The leaves are narrower, softer, thinner and obscurely lineate-striate, while the marginal teeth are far less developed and more distant than in *A. eremophila*. The pedicels are longer and the perianths shorter, somewhat funnel-shaped and markedly stipitate while in its ally the stipus is almost absent. The outer perianth segments are free, on average, for 8 mm. (as against 14 mm. in *A. eremophila*).

The plant here described was collected at my request by an Arab from Shuqra when, in the company of Mr. C. Meintjes, I was passing through that village on the way to and from the Audhali country. Due to lack of time we were unable to collect in the Jebel Arays but, in March 1964, I visited this fascinating mountain country together with Professor Dr. W. Rauh.

The Jebel Arays rises steeply to some 4,500 ft. immediately behind the coast, some 75 miles east of Aden. Its slopes appear to catch the moisture-laden winds blowing off the Arabian Sea throughout the year and the valleys and ridges are covered with a luxuriant vegetation, quite unexpected along the arid coastline of S.W. Arabia. Near the ruined village of Serriya we saw several plants of Aloe which appeared to belong to the species here described.

**Aloe splendens** Lavranos. Nova species, paulum affinis *A. megalacanthae* Bak., sed caule absente vel brevi et procumbete, foliis latioribus, deltoideis apice nihilo vel paulo decurvis, recemis longioribus, pedicellis brevioribus differt.

*Planta* saepe solitaria, acaulis vel caule prostato, tenuis 40 cm. longo; *Folia* arcuata-adscendentia vel erecto-patula, late ensiformia, sensim attenuata, apice acuta, 60 cm. longa, basi 15 cm. lata, 10 mm. crassa, supra viridula, canaliculata, subtus plana vel late convexa, marginibus cartilagineis, fusco-brunneis, dentibus deltoideis, obtusiusculis, rigidis, 2 mm. longis, 15—30 cm. distantibus; *inflorescentiae* valde et repetite ramosae, 140 cm. altae; *pedunculi* basi planoconvexi 30 mm. lati, deinde teretes; *recemi* usque a 15, conico-cylindrici, apice longo,



## PLATE XVI

*Aloe splendens* Lavranos.

Plants on the sandy Dathina plain, east of Mudiya. Height 1.55 m.

Photo: Lavranos.

Flowers 1/1, from bud to post-pollination stage.

Photo: Prof. W. Rauh.

vacuo, bracteato, subdensi, 30—35 cm. longi, 6 cm. diam., laterales interdum paulo breviores; *bracteae* anguste deltoideae, 10 mm. longae, 6 mm. latae, scariosae, albidae, 7-nervatae, pedicelli rubro-brunnei, teretes, 8 mm. longi; *perigonia* rubra, 30—33 mm. longa, breviter stipitata, basi 8 mm. diam. deinde leviter constricta, cylindrico-trigona, segmentibus exterioribus per 13 mm. liberis, interioribus latioribus; *filamenta* basi albida, valde complanata, superne flava, filiformia; *antherae* deinceps per 3 mm. exsertae; *stylus* flavus; *stigma* tractu temporis per 4 mm. exsertum; *ovarium* viride, 7 mm. longum, apice truncatum (Plate XVI.)

HABITAT: South Western Arabia, Dathina plain, 6 miles East of Mudiya approx. 2,500 ft. (760 m.), lat. 13° 50'N., long. 46° 10'E., coll. 3 March 1964, Rauh et Lavranos 13008, (HEID) holotype, (K, PRE) isotype; 1 mile west of Mudiya, 3 March 1964, Rauh et Lavranos 2767; 2 miles east of Mudiya, 3 March 1964, Rauh et Lavranos 2768.

#### DESCRIPTION

*Plant* solitary or forming groups of up to 8 rosettes, usually acaulous but frequently with a prostrate stem up to 40 cm. long.

*Leaves* 20—24 ascending-spreading, deltoid-attenuate, acute, up to 60 cm. long, 15 cm. broad at base, 10 mm. thick; *upper surface* uniformly dull green, often with a purplish-brown tinge, flat, but canaliculate towards the apex; *lower surface* flat or broadly convex, same in colour as the upper surface; *margins* with dark brown cartilaginous border, armed with dark brown, hard, rather blunt, deltoid teeth, 2 mm. long, 15—30 mm. distant but more so towards the apex.

*Inflorescence* a much branched and rebranched panicle, 2—3 simultaneously, 140 cm. high, each with up to 15 racemes, making a total of over 40 racemes to a plant.

*Peduncle* plano-convex and 30 mm. broad at base, thereafter terete, somewhat elliptical in section, brown with a bloom, branched from below the middle, sterile bracts ovate-deltoid, 8—10 mm. long, scarious, white, 11-nerved.

*Racemes* conico-cylindric with a long sterile, bracteate apex, sub-densely flowered, 30—35 cm. long, 6 cm. diameter, the lateral racemes somewhat shorter, only the youngest buds sub-erect, all other buds spreading horizontally, open flowers nutant.

*Bracts* narrowly deltoid, 10 mm. long, 6 mm. broad at base, scarious, white, 7-nerved.

*Pedicels* red-brown, terete, 8 mm. long.

*Perianth* bright scarlet with a bloom, 30—33 mm. long, shortly stipitate, cylindric-trigonus, 8 mm. diameter over the ovary, thereafter constricted to 6 mm., widening to 7 mm. towards the laterally compressed mouth; *outer*